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UTILITY OF NON – INVASIVE DIAGNOSIS AND RISK STRATIFICATION OF DEEP VEIN THROMBOSIS.

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ABSTRACT

Venous thromboembolism (VTE), although relatively easy to treat ,can often be difficult to diagnose non-invasively. Many different non invasive tests are currently available to diagnose VTE, including pulmonary embolism and deep venous thrombosis. The clinical features of DVT are unreliable; calf pain/tenderness, swelling and homan's sign, usually considered as significant are notoriously non-specific and only 25% of these with these symptoms actually have DVT. However a combination of clinical signs/symptoms and risk factors has been shown to improve the diagnostic accuracy.

Methods: A total of 50 patients from General surgery / orthopedics and gynecology wards and ICU patients who were diagnosed as suffering from DVT due to hospital stay for more than 7 days are included in the study along with acontrol group of similar patients without risk factors.

Results: Definitive risk factors have been identified and patients have been categorized accordingly. Age above sixty years and prolong immobilization were major risk factors observed in our study.

KEYWORDS *Non – invasive diagnosis, Deep vein thrombosis, risk factor.*

Introduction :

The term venous thromboembolism (VTE) encompasses both deep venous thrombosis (DVT) and its dislodgment to result in pulmonary embolism (PE). The incidence, which is around 1 in 1000 in the west, remains steady across all age groups in males while in females it is lower in those younger than 55 and increases there after. The importance of DVT lies in the adverse outcomes it produces. Anderson and co-workers noted a12% in-hospital case fatality and a long-term case-fatality of 30% at 3 years. After examining the records of 17,991 patients with idiopathic DVT and 5573 patients with secondary thromboembolism respectively, White et al concluded that Asians and Pacific islanders had a very low incidence of both when compared to whites.

Another study reported a relative risk of 0.2 among Asians when compared to Whites. The occurrence of DVT among hospitalized patients ranges from 0 to 60% depending on the type of surgical procedure. In a study of patients admitted to medical wards and ICU in a tertiary care hospital in India; an incidence of 2.7 per 1000 person/years was noted.

Thrombosis of the deep veins of leg begins in the calf and extends proximally. The incidence of asymptomatic distal thrombi ranges widely from 5 to 70% in hospitalized groups depending on the type of surgical procedure. Only about 25% of the distal venous thromboses extend proximally, and this usually occurs within a week . Proximal vein thrombosis has a much higher propensity to cause PE. Anticoagulants are the mainstay of treatment for DVT. After successful anticoagulation the case-fatality rate falls to 3.6% and the risk of fatal recurrent VTE to 0.3 per 100 patient-years. The risk of DVT remains high up to 12 years after the index episode, cumulative recurrence rates cited are 18%, 25% and 30% after 2, 5 and 8 years respectively.

Various scoring systems have been devised to quantify the risk of DVT. These involve identifying the individual risk factor or clinical feature, assigned a weightage to them and developing cumulative score which is used to stratify patients into various risk groups.

MATERIALS AND METHODS

The study consisted of 50 patients diagnosed as suffering from DVT due to hospital stay for more than 7 days from General surgery, orthopedics, gynecology wards and ICU in our institute were included in the study. The study was carried out from January 2012 to February 2013.Detailed histoiy, clinical examination and all routine investigation were done. Duplex scan was used as a standard for diagnosis. A control group of similar patients admitted in our institute without risk factors were included in the study.

Observation

Table 1: Age Distribution

AGE GROUP	NO. OF PATIENTS	PERCENTAGE (%)
30-34	2	4
35-39	6	12
40-44	8	16
45-49	7	14
50-54	6	12
55-59	1	2
60-64	11	22
65-70	9	18
TOTAL	**50**	**100**

Table 2 : Symptomatology

SYMPTOMS	NO. OF PATIENTS	%
Swelling	50	100%
Pain	37	74%
Fever	27	54%
Discoloration	8	16%
Ulceration	3	6%

Table 3 : Past History

PAST HISTORY	NO. OF PATIENTS	%
Surgery	15	30%
Bedridden	30	60%
Drugs	6	12%
Recurrence	4	8%

Table 4 : Hospital Stay

NO. OF DAYS	NO.OF PATIENTS	%
7-9	22	44%
10-12	18	36%
13-15	7	14%
16-18	1	2%

Discussion

The prevalence of venous thromboembolism in hospitalized patients is approximately 350 cases/100,000 admissions[5] and is a cause of death in approximately 250,000 people annually.[5] In our study we found the incidence to be 400/ 100,000.The incidence of Deep Vein Thrombosis is high in elderly person. In our study, as well as in other studies people more than 60 years were mainly affected. The incidence rises markedly in persons 60 years and above may be as high as 900 cases per 100,000 by the age of 85 years.[6] In overall population males are affected more than female6. In our study also males were found more in number.

Table: 5

Series	Total no. of patients	No. of male patients
Silverstein *et at*	100000	130
Our study	50	11

Lower limbs are the most commonly involved extremity found in various studies. This finding is consistent with our study. Upper extremity DVT is less common but also may lead to PE, especially in the presence of venous catheter. A much less common cause of upper extremity DVT is Paget-Schroetter syndrome.[7]

We observe swelling, pain fever, discoloration were most common presenting features. Their presence correlates with diagnosis of Deep Vein Thrombosis.In one population based study over 90% of patients hospitalized for DVT had atleast one risk factor.[8] The number of risk factors increases with age.

Wells clinical prediction score provides a reliable estimate of the pretest probability of DVT.

Wells clinical prediction scoring system for DVT[9]

Clinical parameter	Score
Active cancer (treatment ongoing or within previous 6 months or palliative)	1
Paralysis, paresis or recent plaster immobilization of the lower extremities	1
Recently bedridden for > 3 days or major surgery within 4 weeks	1
Localized tenderness along the distribution of the deep venous system	1
Entire leg swelling	1
Calf swelling by >3cm when compared with the asymptomatic leg (measured 10 cm below the tibial tuberosity)*	1
Pitting edema (greater in the symptomatic leg)	1
Collateral superficial veins (non varicose)	1
Alternative diagnosis as likely or greater than that of deep vein thrombosis	-2
Total	

In patients with symptoms in both legs, the more symptomatic leg was taken into account.

Inference :

High probability	>3
Moderate probability	1 or 2
Low probability	<0

Absolute risk of DVT in Hospitalized Patients **:

Patients group	DVT Prevalence, %
Spinal Cord injury.	60-80%
Hip or Knee arthroplasty, hip fracture surgery.	40-60%
Major Trauma	40-50%
Stroke	20-30%
Cardiac surgery	15-40%
Major Gynecologic surgery	15-40%
Major Urologic surgery	15-40%
Neurosurgery	15-40%
Medical patients	10-20%
Critical Care Patients	10-20%

** Study based on objective diagnosis for DVT in patients not receiving thromboprophylaxis.[10]

LEVELS OF THROMBOEMBOLISM RISK IN SURGICAL PATIENTS[11]

Levels of Risk	Calf DVT %	Proximal DVT	Clinical PE %	Fatal PE %
Low Risk: Minor surgery in patients < 40 yrs. with no additional risk factors	2	0-4	0.2	0.002
Moderate Risk: Minor surgery in patients with additional risk factors, non major surgery in patients aged 40-60 yrs. with no additional risk factors, major surgery in patients < 40 yrs. with no additional risk factors.	10-20	2-4	1-2	0.1-0.4
High Risk: No major surgery in patients > 60 yrs. or with additional risk factors, major surgeiy in patients > 40 yrs. or with additional risk factors	20-40	4-8	4-8	0.4-1.0
Highest Risk: Major surgery in patients > 40 yrs. + prior VTE, cancer or knee arthroplasty, hip fracture surgery, major trauma, spinal cord injury.	40-80	10-20	10-20	0.2-5

Table : 6

RISK FACTORS	HILLEN HFP STUD*[2]	IN OUR STUDY
Surgery	20-40%	30%
Immobilization	14%	60%
Drugs	8-10%	12%
Recurrent DVT	Not included	8%
Central venous catheterization	3-12%	Not included

Most common risk factor in HILLEN HFP STUDY[12] is history of surgery for cancer patient, while in our study most common risk factor was history of immobilization.

Recommendations for VTE prophylaxis from the American college of chest physicians. (ACCP)[13] Consensus statement

Indication	Prophylaxis methods
Low-risk general surgery	Early ambulation
Moderate-risk general surgery	LDH, LMWH, ES or 1PC
High-risk general surgery	LDH, LMWH or IPC
Very-high-risk general surgery	LDH, LMWH combined with
	ES or IPC
Elective hip replacement	LMWH or warfarin (INR=2.5)
Elective knee replacement	LMWH or warfarin (INR=2.5)
Hip fracture surgery	LMWH or warfarin (INR=2.5)
Neurosurgery	IPC with or without ES & LMWH or LDH if feasible
Trauma	ES and/or IPC, LMWH if feasible
Acute spinal cord injury	LMWH with continuation of LMWH or conversion to warfarin in the rehabilitation phase.

ES = elastic compression stockings.
IPS = intermittent pneumatic compression
LDH = low-dose heparin.
LMWH = low molecular weight heparin

SUMMARY & CONCLUSIONS:

- Prevalence of venous thromboembolism is less in Indian population as compared to whites.
- Deep venous thrombosis constitutes a major health problem.The incidence in males is higher- than in females.
- Definitive risk factors have been identified and patients have been categorized accordingly. Age above sixty years and prolong immobilization were major risk. factors observed in our study.
- In symptomatic patients, Colour Doppler is sensitive and specific in the diagnosis of Deep Vein Thrombosis.
- Timely identification and avoiding the risk factors helps to reduce the incidence of DVT in hospitalized patients.

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